Claims

[c1] 1.A flow field plate, comprising:

at least one flow field path wherein said at least one flow field path has a width, depth, and length such that a molar flow rate of reactant that enters said at least one flow field path is proportional to an area serviced by said at least one flow field path.

[c2] 2.The flow field plate of claim 1 wherein:

said at least one flow field path has a width, depth, and length such that a flow rate of reactant in said at least one flow field path is proportional to an area serviced by said at least one flow field path.

[c3] 3.The flow field plate of claim 1 wherein:

said at least one flow field path has a width, depth, and length such that an electric current density is uniform throughout said flow field plate.

[c4] 4.The flow field plate of claim 1, further comprising:

a second flow field path wherein said second flow field path has a second width, second depth, and second length such that a second molar flow rate of reactant that enters said second flow field path is proportional to a second area serviced by said second flow field path.

[c5] 5.The flow field plate of claim 1, further comprising:

a second flow field path wherein said second flow field path has a second width, second depth, and second length such that a second flow rate of reactant in said second flow field path is proportional to a second area serviced by said second flow field path.

[c6] 6.The flow field plate of claim 1, further comprising:

a second flow field path wherein said second flow field path has a second width, second depth, and second length such that an electric current density is uniform throughout said flow field plate.

[c7] 7.A fuel cell comprising:

at least one flow field plate, said flow field plate having at least one flow field path wherein said at least one flow field path has a cross-sectional area and length such that a molar flow rate of reactant that enters said at least one flow field path is proportional to an area serviced by said at least one flow field path.

[c8] 8.The fuel cell of claim 7, wherein:

said at least one flow field plate has at least one flow field path wherein said at least one flow field path has a cross-sectional area and length such that a flow rate of reactant in said at least one flow field path is proportional to an area serviced by said at least one flow field path.

[c9] 9.The fuel cell of claim 7, wherein:

said at least one flow field plate has at least one flow field path wherein said at least one flow field path has a cross-sectional area and length such that an electric current density is uniform throughout said at least one flow field plate.

[c10] 10.The fuel cell of claim 7, further comprising:

a second flow field plate having a second flow field path wherein said second flow field path has a second cross sectional area and second length such that a second molar flow rate of reactant that enters said second flow field path is proportional to a second area serviced by said second flow field path.

[c11] 11.The fuel cell of claim 7, further comprising:

a second flow field plate having a second flow field path wherein said second flow field path has a second cross sectional area and second length such that a second flow rate of reactant in said second flow field path is proportional to an area serviced by said second flow field path.

[c12] 12.The fuel cell of claim 7, further comprising:

a second flow field plate having a second flow field path wherein said second flow field path has a second cross sectional area and second length such that an electric current density is uniform throughout said second flow field plate.

[c13] 13.A method for sizing a flow field path in a flow field plate for a fuel cell, comprising steps of:

determining an area serviced by said flow field path proportional to a total surface area of said flow field plate;

sizing a cross sectional area and a length of said flow field path so that a molar flow rate of reactant that enters said flow field path is proportional to the area serviced by said flow field path.

[c14] 14.The method of claim 13, wherein:

in said sizing step, said cross sectional area and said length of said flow field path are sized so that a flow rate of reactant in said flow field path is proportional to said area serviced by said flow field path.

[c15] 15.The method of claim 13, wherein:

in said sizing step, said cross sectional area and said length of said flow field path are sized to produce substantially uniform electric current density throughout said flow field plate.

[c16] 16.The method of claim 13, wherein:

in said sizing step, a width, a depth, and said length of said flow field path are sized so that said molar flow rate of reactant that enters said flow field path is proportional to said area serviced by said flow field path.

[c17] 17.The method of claim 13, wherein:

in said sizing step, a width, a depth, and said length of said flow field path are sized so that said flow rate of reactant in said flow field path is proportional to said area serviced by said flow field path.

[c18] 18.The method of claim 13, wherein:
in said sizing step, a width, a depth, and said length of said flow field path are sized so that an electric current density is uniform throughout said flow field plate.

[c19] 19.A flow field plate for use in a fuel cell, said flow field plate comprising: a plurality of flow field paths, wherein:
each flow field path of said plurality of flow field paths has a width, depth, and length such that a flow rate of reactant in said flow field path is proportional to an area serviced by said flow field path.

[c20] 20.The flow field plate of claim 19, wherein:
an electric current density is uniform throughout said flow field plate.